CLAIMS

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

1. A method of executing a linear algebra subroutine on a computer, said method comprising:

selecting a matrix subroutine from among a plurality of matrix subroutines that performs a matrix multiplication.

2. The method of claim 1, wherein said computer includes an L1 cache, said method further comprising:

determining a size of each of matrices involved in said matrix multiplication; and

selecting one of said matrices to reside in an L1 cache, based on said determined size,

wherein said selecting a matrix subroutine comprises determining which of said matrix subroutines is consistent with said matrix selected to reside in said L1 cache.

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3. The method of claim 1, wherein said matrix subroutine comprises a subroutine from a LAPACK (Linear Algebra PACKage).

4. The method of claim 3, wherein said LAPACK subroutine comprises a BLAS Level 3 L1 cache kernel.

5. The method of claim 1, wherein said selecting a matrix subroutine comprises an aspect of a generalized matrix streaming process in which matrix data is stored in multiple levels of computer memory and said matrix data is systematically streamed into said matrix multiplication.

6. The method of claim 1, wherein said plurality of matrix subroutines comprises six possible matrix subroutines.

7. An apparatus, comprising:

a memory to store matrix data to be used for processing in a linear algebra program;

a processor to perform said processing; and

a selector to select one of a plurality of possible matrix subroutines to perform said processing.

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8. The apparatus of claim 7, further comprising an L1 cache, wherein said selector makes the selection by:

determining a size of each of matrices involved in said matrix multiplication; and

selecting one of said matrices to reside in said L1 cache, based on said determined sizes,

wherein said selecting a matrix subroutine comprises determining which of said matrix subroutines is consistent with said matrix selected to reside in said L1 cache.

9. The apparatus of claim 7, wherein said matrix subroutine comprises a subroutine from a LAPACK (Linear Algebra PACKage).

10. The apparatus of claim 9, wherein said LAPACK subroutine comprises a BLAS Level 3 L1 cache kernel.

11. The apparatus of claim 7, wherein said selector for selecting a matrix subroutine includes a storage for storing matrix data in multiple levels of computer memory and a mechanism for streaming said matrix data into said matrix multiplication process.

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12. The apparatus of claim 7, wherein said plurality of matrix subroutines comprises six possible matrix subroutine kernel types.

13. A signal-bearing medium tangibly embodying a program of machine-readable instructions executable by a digital processing apparatus to perform a method of executing a linear algebra subroutine on a computer, said method comprising:

selecting a matrix subroutine from among a plurality of matrix subroutines that performs a matrix multiplication.

14. The signal-bearing medium of claim 13, wherein said digital processing apparatus includes an L1 cache, said method further comprising:

determining a size of each of matrices involved in said matrix multiplication; and

selecting one of said matrices to reside in an L1 cache, based on said determined size,

wherein said selecting a matrix subroutine comprises determining which of said matrix subroutines is consistent with said matrix selected to reside in said L1 cache.

15. The signal-bearing medium of claim 13, wherein said matrix subroutine comprises a subroutine from a LAPACK (Linear Algebra PACKage).
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16. The signal-bearing medium of claim 15, wherein said LAPACK subroutine comprises a BLAS Level 3 L1 cache kernel.

17. The signal-bearing medium of claim 13, wherein said selecting a matrix subroutine comprises an aspect of a generalized matrix streaming process in which matrix data is stored in multiple levels of computer memory and said matrix data is systematically streamed into said matrix multiplication.

18. The signal-bearing medium of claim 13, wherein said plurality of matrix subroutines comprises six possible kernel type subroutines.

19. A method of providing a service involving at least one of solving and applying a scientific/engineering problem, said method comprising at least one of:

using a linear algebra software package that performs one or more matrix processing operations, wherein said linear algebra software package selects a matrix subroutine from among a plurality of matrix subroutines that performs a matrix multiplication;

providing a consultation for solving a scientific/engineering problem using said linear algebra software package;

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transmitting a result of said linear algebra software package on at least one of a network, a signal-bearing medium containing machine-readable data representing said result, and a printed version representing said result; and

receiving a result of said linear algebra software package on at least one of a network, a signal-bearing medium containing machine-readable data representing said result, and a printed version representing said result.

20. The method of claim 19, wherein said matrix subroutine comprises a BLAS Level 3 L1 cache kernel from a LAPACK (Linear Algebra PACKage).